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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,466	02/04/2002	Robert J. Calvet	M-12486 US	6230

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EXAMINER	
LEE, JOHN D	

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 04/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/067,466	CALVET ET AL.	
	Examiner	Art Unit	
	John D. Lee	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-64* is/are pending in the application.

4a) Of the above claim(s) *52-64* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) ← is/are rejected. 1-3, 5, 6, 8, 9, 11-19, 21-24, 33-36 and 39-50

7)☒ Claim(s) ← is/are objected to. 7, 10, 20, 25-32, 37, 38, and 51

8)☒ Claim(s) *1-3 and 5-64* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

This Office action is responsive to applicant's amendment submitted on February 13, 2004. Claim 4 has been canceled. Claims 52-64 remain withdrawn from consideration by the Examiner, 37 CFR § 1.142(b), as being drawn to a non-elected invention. Claims 1-3 and 5-51 are subject to examination.

Applicant's amendments have obviated the previously indicated objection to the disclosure and the previously indicated rejection of claim 51 under 35 U.S.C. § 112, second paragraph. Such objection and rejection are, accordingly, withdrawn.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5, 8, 9, 11-13, 16-18, 21-24, 41, 46, 47, 49, and 50 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by U.S. Patent 5,461,515 to Sorce. Sorce discloses a passive alignment assembly configured to support an optical element (a mirror) to a predetermined position, the assembly comprising a base **12** having a first mating part, a payload **16** supporting the mirror and having a second mating part, and a connecting structure (six flexible connecting elements **18**) which contacts the first mating part of the base and the second mating part of the payload. The Sorce connecting structure constrains the payload in six degrees of freedom (column 2, lines 60-62), including position and attitude. The "micromachined" limitation in line 3 of claims 1 and 49 and the limitation of claim 5 represent *process* limitations that are given no weight in comparing the claimed structure to that of the prior art. As can be seen in the reference, the base and the payload comprise substantially planar and circular wafers. Note that the

Sorce flexible connecting elements have internal flexure assemblies (e.g. ball joints) at each end where contact is made to the base and the payload. With respect to the last limitation in applicant's claim 23, note that each Sorce connecting element has a plurality of attachment points (one at either end). Sorce specifically states that the arrangement therein is a *kinematic support system* (column 1, lines 37-39).

Claim 48 is rejected under 35 U.S.C. § 102(b) as being clearly anticipated by U.S. Patent 6,071,143 to Barthel et al. See Figure 3 of Barthel et al which discloses an optical element positioning assembly meeting all the limitations broadly set forth in this claim.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6, 14, 15, 19, 33-36, 39, 40, and 42-45 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,461,515 to Sorce. As mentioned above, it can clearly be seen that the Sorce base and payload comprise substantially planar and circular wafers. The material of the wafers, however, is not disclosed. It would have been obvious to a person of ordinary skill in the art, therefore, to have used wafers of known materials for optical supporting structures, such as silicon. It is clear that the six degrees of freedom imparted by the Sorce structure include three orthogonal translational positions and three orthogonal angular positions. Although not specifically stated in the reference, it is obviously clear that the flexible connecting elements enforce planarity, increase bending stiffness in the base and payload, and provide a desired trajectory of motion for the payload. The use of "receptacles" to position an optical element on the

base and/or payload of Sorce would have been likewise obvious, since this is merely a generic term for attachment structures which must be present. Similarly, the use of adhesives or slots & tabs for attachment would have been obvious (since these are very common means of attachment in all optical arts). Although the Sorce apparatus is designed to support a mirror, its use for supporting other optical elements (e.g. optical fibers, lenses, and diodes) in six degrees of freedom would have been analogous and therefore obvious. Finally, since a slip-fit joint assembly is analogous to a ball joint assembly (as used in Sorce), the use of same for attaching the connecting elements to the base and payload in the reference would have been obvious to the person of ordinary skill in the art.

Claims 7, 10, 20, 25-32, 37, 38, and 51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Sorce (the closest prior art of record to the assembly of these claims) does not disclose or reasonably suggest having the connecting structure (six flexible connecting elements **18**) formed from a substantially flat wafer. Sorce also does not disclose or suggest the particular numerical values of constrainment set forth in applicant's claim 10. Sorce further does not disclose or suggest configuring at least one of the connecting elements **18** as an optical bench to support at least one optical element. Sorce also does not disclose or reasonably suggest the use of a *preload*, embodied in structural elements designed to impart a *preload*. Sorce further does not disclose or reasonably suggest any thermal compensation flexure assembly associated with the base, or any strain isolation flexure assembly associated

with the base. Finally, Sorce does not disclose or reasonably suggest the inclusion of linear actuators in the connecting structure forming a motion control stage.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The two (2) newly cited U.S. Patents to Calvet et al, derived from patent applications filed by the inventors of the present application on the same day as the instant application, show closely related alignment assemblies.

Applicant's arguments submitted on February 13, 2004, with respect to the above-rejected claims, have been fully considered but they are not deemed to be persuasive. Applicant's primary argument is that Sorce does not disclose a passive alignment assembly configured to support an optical element to a pre-determined position, wherein the connecting structure constrains the payload in about five to about six degrees of freedom with respect to the base (emphasis applicant's). The Examiner respectfully disagrees with this assertion and believes that Sorce clearly teaches these limitations. First of all, Sorce is clearly directly to a passive alignment assembly for the mirror supported by payload **16** (Figures 1 and 2). Note particularly the last paragraph in column 1: it is explained herein that the assembly is designed to keep the optical element (mirror) in a pre-determined position of alignment through the compensating effect of the connecting structure. There are no active elements which accomplish this; the compensation and subsequent alignment is accomplished through the design of the connecting structure alone which compensates in all known degrees of movement (i.e. five to six degrees of freedom). Therefore, no matter what types of undesired extraneous forces may come upon the assembly (linear, rotational, twisting, etc.), the compensation effect of the connecting structure maintains the desired position of the mirror. Applicant

correctly points out that the optical element (mirror) of Sorce has freedom to move in six degrees. So does applicant's claimed assembly! They are both "constrained" for movement in the same manner. This freedom of movement is what allows for the ability to maintain a pre-determined position with respect to the base. Applicant's arguments with respect to certain other of the claims are also not persuasive. With respect to claim 6, applicant argues that Sorce does not suggest that the "support legs 28-38" are "formed from substantially flat silicon wafers. With all due respect, this is a distortion of what is being claimed and of what Sorce shows. The claim recites that the base and the payload are formed from substantially flat silicon wafers. In the rejection, the Examiner identified the "base" of Sorce as **12** and the "payload" of Sorce as **16**. In Figures 1 and 2 of the Sorce drawings, it is clearly seen that each of these elements is wafer-like. The rejection points out that the material of such wafers is not disclosed. As stated in the rejection, however, it would have been obvious to a person of ordinary skill in the art to have used wafers of known materials for optical supporting structures, such as silicon. Support legs 28-38 have nothing to do with the Examiner's explanation. With respect to claim 8, applicant argues that Sorce does not teach a "payload" that is a substantially planar wafer. Again, the Examiner refers applicant to the explanation in the rejection above (the "payload" of Sorce is element **16**). With respect to claim 9, applicant argues that Sorce does not teach a "payload" that is a substantially circular ring. Once again, the Examiner refers applicant to the explanation in the rejection above (the "payload" of Sorce is element **16**, which is clearly circular and ring-like). With respect to claims 14 and 15, applicant argues that the Office action does not specify how the connecting elements of Sorce "enforces planarity" or "increases bending stiffness in the base and

payload". As noted above, the last paragraph in column 1 of Sorce explains that the assembly is designed to keep the optical element (mirror) in a pre-determined position of alignment through the compensating effect of the connecting structure. This is an enforcement of planarity and is also evidence of increased bending stiffness in the base and payload. The argument is thus not persuasive. With respect to claim 48, applicant argues that Barthel et al does not teach a "payload plate being configured to position at least one optical element". The Examiner disagrees. The "payload plates" of Berthel et al are identified as elements **30**, which are electro-optic printed circuit boards. Electro-optic printed circuit boards, as is known in the art, position and hold a variety of electronic, optical, and opto-electronic elements thereon. As broadly worded, claim 48 of the present application reads directly on the Berthel et al reference.

Note that applicant's arguments with respect to claims 10 and 20 are persuasive and these two claims are now deemed to patentably distinguish over the prior art.

THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR § 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and an advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR § 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.

John D. Lee

John D. Lee
Primary Patent Examiner
Group Art Unit 2874